The Impact of Culture on Collaborative Technologies

Bedoor AlShebli
Karrie Karahalios
Department of Computer Science
University of Illinois at Urbana-Champaign

Outline

- Define culture
- Cultural constraints affecting collaboration
  - Language barriers
  - Population/Cultural stereotypes
  - Anthropometrics
- Research findings in the domain
- Provide guidelines for designing culturally-oriented collaborative tools
- Conclusion

What is Culture?

- Muray: "*Culture is central on how people:*
  - *View things*
  - *Make sense of concepts*
  - *Express themselves*
  - *Make decisions"*
- Hoft: *"learned behavior consisting of thoughts, feelings, and actions"*
- Different types of cultures: ethnic groups, countries, religious groups, tribes, and minority groups.

Why is culture important?

- Previous studies on culture and technology has shown that beliefs and values shared by a group affect the group's behavior in a variety of ways
- Accelerate or decelerate the implementation and adoption of technology

Cultural Constraints Affecting Collaboration : **(1) Language**

- One of the biggest constraints faced in cross-cultural collaboration
- Case where linguistic differences led to performance problems:
  - The 1977 Tenerife disaster, leading to 583 fatalities.
    - The accident still has the highest number of fatalities of any single accident in aviation history.

(1) Language (cont…)

- Ezra Pound (1935) introduced an interesting analysis of the way meaning is carried by a language
- Distinguished between:
  - *Phanopoeia*: meaning is carried by images conjured up in the reader's mind by the words read
  - *Melopoeia:* meaning is carried by the sound of the words used
  - *Logopoeia:* a string of words (i.e. a sentence) carries a meaning

(1) Language (cont…)

- Sakuma and Yaguchi presented a questionnaire based on Smith's (1981) to investigate the strength of population stereotypes
- One of the questions used was:

  "Working with a fire crew the hose-man calls 'Pressure High!' What should be done? Raise the pressure or lower the pressure?"

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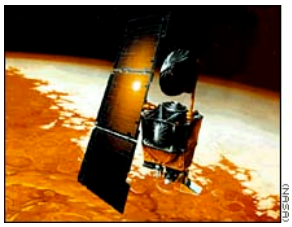
	U.S.	Japanese	Dutch	Greek
Raise	0.25	0.58	1.00	0.63
Lower	0.75	0.42	0.00	0.37

(2) Population/Cultural Stereotypes

- Different cultures respond to stimuli differently
- Classical example: Turning a light switch on
  - U.S.: flipping the switch upwards
  - Europe: flipping the switch downwards
  - Japan: flipping the switch to the right

(2) Cultural Stereotypes (cont…)

- Example where cultural confusion has led to accidents:
  - NASA's Mars Climate Orbiter was destroyed due to a navigation error. (1999)
  - NASA lost $125 million



(2) Cultural Stereotype (cont…)

- Courtney (1994) tested over 700 Chinese in Hong Kong, and found a number of stereotypes that were not found with Western subjects.
  - E.g. The meaning of colored signals.
  - He concluded that:

    "*The most striking comparison was between the near 100% American responses for the red for stop and green for go associations, and the less that 50% Chinese responses for those two very important associations... The red for danger in the Western world may not be so clear for the Chinese because red is the color of communism in the People's Republic of China and for happiness and prosperity for all Chinese people.*"

(2) Cultural Stereotypes (cont…)

- As military equipment is shared among multi-national forces, taking population stereotypes into consideration becomes extremely important.
- Jost's Law (1897) states that:

  "The stereotypical habit acquired over many years in one population will from time to time interfere with performance even after much practice, and particularly in an emergency when a rapid "skill-based" reaction is required."

(3) Anthropometrics

- Factors as simple as differences in anatomical dimensions can be considered cultural as well.
- Fernandez et al. (1989) studied Korean factory female workers:
  - They found that the difference in the eye height is significant enough to cause difficulties if Asian women have to look over a high control panel when operating equipment manufactured in the West.

(3) Anthropometrics (cont…)

- Okuniribido (2000) surveyed the dimensions of the hands of western Nigerians and compared them with American, British and Hong Kong hands
  - He found that there were sufficient differences to affect the ability of Nigerians to use a “power grip” when using Western tools.
  - It might be difficult for them to work when wearing safety gloves sized for Western Hands

(3) Anthropometrics (cont…)

- Singh et al (1995) found that 40% of local applicants wishing to be trained as Singapore military pilots would be rejected.
  - Cockpit dimensions of fighter aircrafts were based on the 5th and 95th percentile of Western anthropometric data.
- Ong (1995) found that French anthropometric design standards would only be suitable for 15% Thais and 20% Vietnamese!

Affect of Cultural Diversity on Teams

- The increase in globalization has increased the opportunities for workers of different cultures to interact and work together.
- Cox, Lobel and McLeod conducted an empirical study comparing the performance of teams of 4 ethnic groups:
  - Anglo-American
  - African-American
  - Asian-American
  - Hispanic-American
- They found that organizations with an ethnically diverse work force worked better than those that were all Anglo-American

Designing Culturally-Oriented Collaborative Technologies

- The key problem of inter-cultural design is how to get the message across to the user of another culture
- The most important fact is that the designer and the users of different cultures agree on the information meaning and its interpretation

Designing Culturally-Oriented Collaborative Technologies (cont…)

(1) Identify and classify the kind of system you are designing:

- Röse mentioned two established approaches for inter-cultural design: *Internationalization* and *Localization*.
- Internationalization describes a basic structure with the consideration of future integration of culture-specific requirements
  - This design concept takes into account some general culture specifics (like language, format, etc.) and is often designed for flexible switching between different user cultures
- Localization focuses on one specific user culture

Designing Culturally-Oriented Collaborative Technologies (cont…)

(2) Know the users and their cultural requirements:

- An empirical analysis of the user requirements in each culture and the product to be developed for the respective markets is a must
- Cultural requirements for the targeted market include language, cultural stereotypes, and anthropometrics
- A good understanding of culture could provide the designers with clues to answering their questions

Designing Culturally-Oriented Collaborative Technologies (cont…)

(3) Look at existing work, especially when designing culture specific user interfaces, before creating your own design:

- del Galdo and Fernandes' works included colors, icons, symbols, date formats, time formats, number formats, language translations and more for different cultures.
- Choong, Dong and Salvendys' works addressed other design issues such as menu direction, interface structure, information flow, etc.

Designing Culturally-Oriented Collaborative Technologies (cont…)

(4) Do not neglect other "hidden" cultural constraints that could still affect collaboration when designing:

- This includes attitudes, behaviors, problem-solving strategies, thinking patterns, etc.
- There are also other design issues that are beyond the user interfaces but are actually closely related to the user's interaction with machines.
  - Röse listed some of the most prominent ones: machine functionality, appropriate technology, service model, technical documentation, and general machine design

Thank you!